REMARKS/ARGUMENTS

Claims 1-8 have been canceled, and claims 9-14 are pending.

Claim 9 is amended to include step (c) from its dependent claim 10, and claim 10 is amended to delete step (c).

Claims 11 and 12 are amended to change their dependency from claim 10 to claim 9. Claim 12 is further amended to be made more clear.

Claim 13 is amended to change its dependency from claim 11 to claim 10 in accordance with the Examiner's helpful suggestion.

Claim 14 is amended to more clearly set forth the invention.

Claims 15-18 are newly added. Support for these claims can be found throughout the specification and the drawings.

No new matter is believed added.

Claim objections

Claim 13 is objected to because it improperly depends from claim 11 rather than from claim 10. Claim 13 has been accordingly amended to depend from claim 10. Withdrawal of this objection is respectfully requested.

Claim rejections under 35 USC 103(a)

Claims 9-14 are rejected under 35 USC 103(a) as being unpatentable over Fujii et al. (USPN 4,774,556) in view of Mori (JP 63288047) and Kao et al. (IEEE VOL. ED-35, 1/1988). This rejection is respectfully traversed.

Claim 9 as amended distinguishes over Fujii et al., Mori, and Kao et al. taken singly or in combination at least by reciting "(b) heating the substrate to at least about 1,100°C to form a first layer of silicon oxide ... inside the trench; and (c) forming a layer of silicon nitride on the first layer of silicon oxide".

The Examiner indicates that Fujii et al. in Fig. 15 shows trenches having an oxide layer 41 over which a silicon nitride layer 5 is formed. However, oxide layer 41

is a tunnel oxide layer which is not formed by "heating the substrate to at least about 1,100°C" as recited in Applicants' claim 9. The Examiner attempts to overcome this deficiency by referring to Fig. 6 and corresponding portions of column 6 wherein Fujji et al. teach the formation of a thermally oxidized film 42 at a temperature from 1,000°C to 1,050°C. Applicants contend that modifying the non-volatile memory device in Fig. 5 in this manner is improper because the proposed modification would render this non-volatile memory device unsatisfactory for its intended purpose of storing data (MPEP 21430.01; In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Fig. 6 of Fujji et al. is a cross section view at an intermediate process step leading to the formation of the non-volatile memory device shown in Fig. 9. In this memory device, floating gates 51, 52 are used to store data. Floating gates 51, 52 are charged or discharged (i.e., programmed or erased) through the thin tunnel oxide layer 41 using the well-known tunneling mechanism (see col. 7:39-42 and col. 8:11-13). In contrast, the non-volatile memory device in Fig. 15 does not have any floating gates, and instead stores charge at the interface between tunnel oxide layer 41 and silicon nitride layer 5. This interface is shown in Fig. 19 by reference numeral 411. Charge is stored at or removed from this interface through the thin tunnel oxide layer 41 using the tunneling mechanism (see col. 10:29-34 and col. 10:50-52). Thus, the two memory devices in Figs. 9 and 15 are distinct both in their structure and method of formation.

Tunnel oxide is a thin layer of oxide carefully engineered to enable tunneling of electrons. Thus, without a properly formed tunnel oxide layer, the non-volatile memory device would not program or erase. Fujii et al. form tunnel oxide layer 41 of 20-100Å by using dry oxygen diluted with argon gas (see Fig. 15 and col. 9:39-43). In contrast, oxide layer 42 in Figs. 6 and 9 is thermally formed to have a thickness of 500-1,000Å using dry oxygen at a temperature from 1,000-1,050°C (see col. 6:36-41). To replace the 20-100Å tunnel oxide layer 41 in the Fig. 15 memory device with the 500-1000Å thick thermally oxidized film 42 in Figs. 6 and 9, as suggested by the Examiner, would result in a non-volatile memory device which would not program or erase because no tunneling of electrons can occur through the thick thermally oxidized film 42. This

would render the non-volatile memory device in Fig. 15 non-satisfactory for its intended purpose of storing data.

Thus, Fujii et al. fail to teach or suggest the above cited steps of Applicants' claim 9. Neither do Mori and Kao et al. teach or suggest the above-cited steps of Applicants' claim 9.

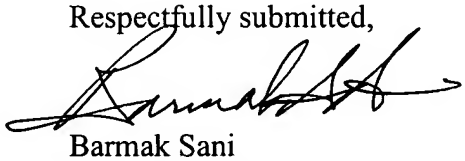
Thus, Claim 9 and its dependent claims 10-13 and 17-18 distinguish over the cited references at least for the above reasons.

Claim 14 includes similar limitations to those of claim 9 cited above, and thus, claim 14 and its dependent claims 15-16 distinguish over the cited references at least for the same reasons stated above.

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Barmak Sani
Reg. No. 45,068

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, 8th Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300

BXS:gjs
PA 3293831 v1